

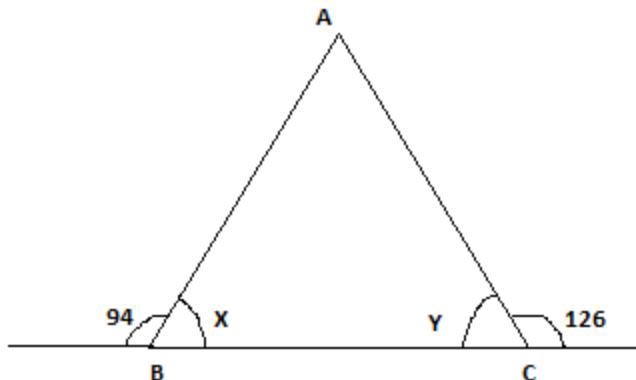
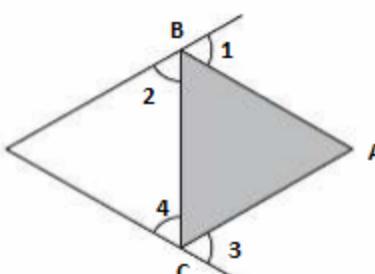
SET	A, B, C
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**INDIAN SCHOOL MUSCAT
HALF YEARLY EXAMINATION 2023
MATHEMATICS (041/241)**

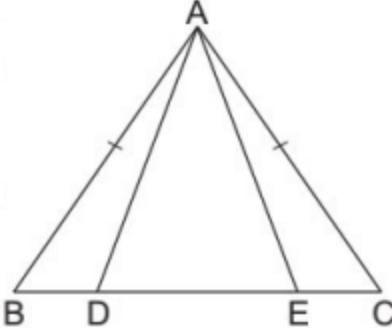
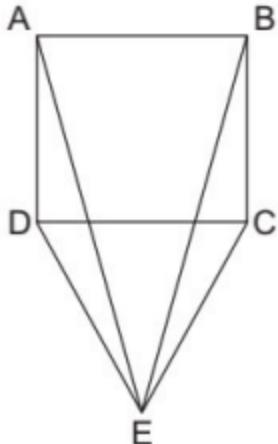
CLASS: IX

Max.Marks: 80

MARKING SCHEME					
SET	QN. NO	VALUE POINTS			MARKS SPLIT UP
		SET-A	SET-B	SET- C	
	1	(c) 0.705	(d) right angled	(b) Bar graph	1
	2	(b) 14	(a) isosceles but not congruent	(a) $BC = PQ$	1
	3	(d) 125	(a) 100°	(d) 36°	1
	4	(d) the line $x + y = 0$	(b) 1	(c) (-3, -2)	1
	5	(b) (6,8)	(d) (-3, 2)	(c) $\frac{25}{7}$	1
	6	(a) (0,0)	(c) $\frac{18}{25}$	(d) right angled	1
	7	(d)12.5,17.5	(b) (6,8)	(d) (-3, 2)	1
	8	(c) $\frac{25}{7}$	(d) 125	(d) the line $x + y = 0$	1
	9	(d) (-3, 2)	(c) 0.705	(b) 14	1
	10	(c) (-3, -2)	(b) Bar graph	(c) $\frac{18}{25}$	1
	11	(b) 1	(b) 14	(c) 0.705	1
	12	(d) 36°	(d) the line $x + y = 0$	(d) 125	1
	13	(a) 100°	(a) (0,0)	(b) (6,8)	1
	14	(a) $BC = PQ$	(c) $\frac{25}{7}$	(d)12.5,17.5	1
	15	(a) isosceles but not congruent	(c) (-3, -2)	(b) 1	1
	16	(b) Bar graph	(d) 36°	(a) 100°	1

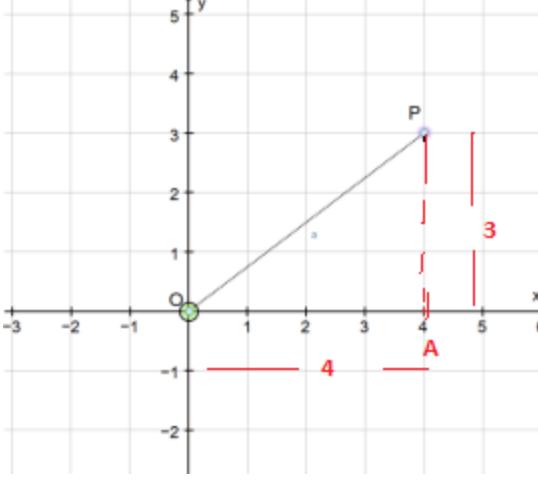
	$2x + 30 + 3x = 180^\circ$ (straight angle /linear pair) $5x = 150$ $x = 30^\circ$ Complement of 'x' is 60°	$\frac{1}{2} + \frac{1}{2}$
	OR	
	 <p>$x + 94 = 180$ (linear pair) $\Rightarrow x = 86^\circ$ and $y + 126 = 180 \Rightarrow y = 54^\circ$ $86 + 54 + \angle BAC = 180^\circ$ (angle sum property of a Δ) $\Rightarrow \angle BAC = 40^\circ$</p>	1 1 1
A	<p>27</p>  <p>$\angle 1 + \angle A + \angle 2 = 180^\circ$ (straight angle) $\Rightarrow \angle 1 + 60 + \angle 2 = 180^\circ$ $\Rightarrow \angle 1 + \angle 2 = 120^\circ$ Similarly, $\angle 3 + \angle 4 = 120^\circ$ $\Rightarrow \angle 1 + \angle 2 + \angle 3 + \angle 4 = 240^\circ$</p>	1 1 1
A	<p>28</p> cost of five pencils = cost of two ball point pens $\Rightarrow 5x = 2y$ $\Rightarrow 5x - 2y = 0$ $10x = 4y \Rightarrow 4x = 8 \Rightarrow x = 2$ \therefore Cost of 10 pencils = Rs. 32	1 1 1

A	29	<p>B (-2,2)</p> <p>A (3,2)</p> <p>C (-2,-3)</p> <p>D (3,-3)</p> <p>C(-2,-3)</p> <p>Area = $5 \times 5 = 25$ sq units</p>	1 1 1
A	30	<p>Given, To prove, Construction, figure</p> <p>Correct proof with reasons</p> <p style="text-align: center;">OR</p>	$\frac{1}{2} + \frac{1}{2}$ 2
A	31	<p>For coordinate axes, proper scale</p> <p>For neat and accurate graph</p>	1 2
		<p style="text-align: center;">SECTION D</p> <p style="text-align: center;">(This section comprises of long answer-type questions (LA) of 5 marks each)</p>	
A	32	$x = \frac{\sqrt{2}+1}{\sqrt{2}-1} \Rightarrow x^2 = \frac{3+2\sqrt{2}}{3-2\sqrt{2}}$ $y = \frac{\sqrt{2}-1}{\sqrt{2}+1} \Rightarrow y^2 = \frac{3-2\sqrt{2}}{3+2\sqrt{2}} \quad \& xy = 1$ $x^2 + y^2 + xy = 17 + 12\sqrt{2} + 17 - 12\sqrt{2} + 1 = 35$ <p style="text-align: center;">OR</p> $x = 3 + 2\sqrt{2} \Rightarrow \frac{1}{x} = 3 - 2\sqrt{2}$ $\Rightarrow x + \frac{1}{x} = 6, \text{ which is rational}$ $\text{Also, } x - \frac{1}{x} = 4\sqrt{2}$ $\Rightarrow x^2 - \frac{1}{x^2} = \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right) = 6 \times 4\sqrt{2} = 24\sqrt{2}$	1 1 1 1 1 1 1 1 1

			1+1
A	33	<p>(i) $(0.00032)^{\frac{-2}{5}} = \left(\frac{2}{10}\right)^5 \times \frac{-2}{5} = \left(\frac{2}{10}\right)^{-2} = 5^2 = 25$</p> <p>(ii) $\frac{2^{30} + 2^{29} + 2^{28}}{2^{31} + 2^{30} - 2^{29}} = \frac{2^{28}(2^2 + 2 + 1)}{2^{29}(2^2 + 2 - 1)} = \frac{1}{2} \times \frac{7}{5} = \frac{7}{10}$</p>	$1\frac{1}{2} + 1$ $1+1+\frac{1}{2}$
A	34	 <p>Given, To Prove In ΔABE & ΔACD $AB = AC$ (given) $\angle B = \angle C$ (ΔABC is isosceles) $BE = CD$ (given) $\Rightarrow \Delta ABE \cong \Delta ACD$ (SAS\cong) $AE = AD$ (c.p.c.t)</p> <p>OR</p>  <p>Given, To prove In ΔADE & ΔBCE $AD = BC$ $DE = CE$ $\angle ADE = \angle BCE (90^\circ + 60^\circ = 150^\circ)$ $\therefore \Delta ADE \cong \Delta BCE$ (SAS\cong)</p> <p>Also $\frac{\text{area of } \Delta CDE}{\text{area of square } ABCD} = \frac{\frac{\sqrt{3}}{4} (CD)^2}{(CD)^2} = \frac{\sqrt{3}}{4} \Rightarrow \sqrt{3} : 4$</p>	1 1 1 1 1 1 1 1 1 1 1 1 1 $\frac{1}{2}$

A	35	<p>For coordinate axes, proper scale</p> <table border="1"> <thead> <tr> <th>Marks</th><th>No of Students</th><th>Adjusted Frequency</th></tr> </thead> <tbody> <tr> <td>100 - 150</td><td>60</td><td>$\frac{50}{50} \times 60 = 60$</td></tr> <tr> <td>150 - 200</td><td>100</td><td>$\frac{50}{50} \times 100 = 100$</td></tr> <tr> <td>200 - 300</td><td>100</td><td>$\frac{50}{100} \times 100 = 50$</td></tr> <tr> <td>300 - 500</td><td>80</td><td>$\frac{50}{200} \times 80 = 20$</td></tr> <tr> <td>500 - 800</td><td>180</td><td>$\frac{50}{300} \times 180 = 30$</td></tr> </tbody> </table> <p>For neat and accurate graph</p>	Marks	No of Students	Adjusted Frequency	100 - 150	60	$\frac{50}{50} \times 60 = 60$	150 - 200	100	$\frac{50}{50} \times 100 = 100$	200 - 300	100	$\frac{50}{100} \times 100 = 50$	300 - 500	80	$\frac{50}{200} \times 80 = 20$	500 - 800	180	$\frac{50}{300} \times 180 = 30$	1 2 2
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		SECTION E																			
A	36	<p>(i) 20 (ii) Histogram / frequency polygon (iii) 8 OR 100 – 120, class mark = 110</p>	1 1 2																		
A	37	<p>(i) $5x + 2y = 120$ (ii) Rs 155 (iii) $0x + y - 6 = 0$</p> <p style="text-align: center;">OR</p> <p>The coordinates of the points on the line representing the corresponding linear equation</p>	1 1 2																		
A	38	<p>(i) 96° (ii) 42° (iii) 222° OR Yes, $2y + z = 48 + 42 = 90^\circ$</p>	1 1 2																		
		SECTION B																			
		This section comprises of very short answer type-questions (VSA) of 2 marks each																			
B	23	<p>$y = 3x$ (i) the value of y, when $x = -3$ $y = -9$ (ii) the value of x, when $y = 3$ $3 = 3x$ $\Rightarrow x = 1$</p>	1 1																		
B	25	<p>$(-2, 9) = (1+s, t^2)$ $\Rightarrow s = -3$ & $t = 3$ $P(2s, -3t) = (-6, -9)$ $Q(s^2, 1-t) = (9, -2)$</p>	1 1 1 2																		
		SECTION C																			
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B	28	$y = 50 + (x - 1)10 \Rightarrow 10x - y + 40 = 0$	1 + 1																		

		$y = 50 + (7 - 1)10 = ₹ 110$	1																																
B	31	P and P' are mirror images of each other. Trapezium $\text{Area} = \frac{1}{2}(14 + 4) \times 5 = 45 \text{ sq. units}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$																																
		SECTION D (This section comprises of long answer-type questions (LA) of 5 marks each)																																	
B	33	(i) $\frac{1}{3+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{3}} + \frac{1}{\sqrt{3}+1} = \frac{3-\sqrt{7}}{2} + \frac{\sqrt{7}-\sqrt{5}}{2} + \frac{\sqrt{5}-\sqrt{3}}{2} + \frac{\sqrt{3}-1}{2}$ $= \frac{3-1}{2} = 1$ (ii) $\frac{2^{x-1} + 2^x}{2^{x+1} - 2^x} = \frac{2^x(2^{-1} + 1)}{2^x(2-1)} = \frac{1}{2} + 1 = \frac{3}{2}$	1+1+1 1 + 1																																
B	34	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 5px;">Age (in years) (Class interval)</th> <th style="text-align: left; padding: 5px;">Frequency</th> <th style="text-align: left; padding: 5px;">Width of the class</th> <th style="text-align: left; padding: 5px;">Height of the rectangle</th> </tr> </thead> <tbody> <tr> <td style="text-align: left; padding: 5px;">1–2</td> <td style="text-align: left; padding: 5px;">5</td> <td style="text-align: left; padding: 5px;">1</td> <td style="text-align: left; padding: 5px;">$\left(\frac{5}{1} \times 1\right) = 5$</td> </tr> <tr> <td style="text-align: left; padding: 5px;">2–3</td> <td style="text-align: left; padding: 5px;">3</td> <td style="text-align: left; padding: 5px;">1</td> <td style="text-align: left; padding: 5px;">$\left(\frac{3}{1} \times 1\right) = 3$</td> </tr> <tr> <td style="text-align: left; padding: 5px;">3–5</td> <td style="text-align: left; padding: 5px;">6</td> <td style="text-align: left; padding: 5px;">2</td> <td style="text-align: left; padding: 5px;">$\left(\frac{6}{2} \times 1\right) = 3$</td> </tr> <tr> <td style="text-align: left; padding: 5px;">5–7</td> <td style="text-align: left; padding: 5px;">12</td> <td style="text-align: left; padding: 5px;">2</td> <td style="text-align: left; padding: 5px;">$\left(\frac{12}{2} \times 1\right) = 6$</td> </tr> <tr> <td style="text-align: left; padding: 5px;">7–10</td> <td style="text-align: left; padding: 5px;">9</td> <td style="text-align: left; padding: 5px;">3</td> <td style="text-align: left; padding: 5px;">$\left(\frac{9}{3} \times 1\right) = 3$</td> </tr> <tr> <td style="text-align: left; padding: 5px;">10–15</td> <td style="text-align: left; padding: 5px;">10</td> <td style="text-align: left; padding: 5px;">5</td> <td style="text-align: left; padding: 5px;">$\left(\frac{10}{5} \times 1\right) = 2$</td> </tr> <tr> <td style="text-align: left; padding: 5px;">15–17</td> <td style="text-align: left; padding: 5px;">4</td> <td style="text-align: left; padding: 5px;">2</td> <td style="text-align: left; padding: 5px;">$\left(\frac{4}{2} \times 1\right) = 2$</td> </tr> </tbody> </table> <p>For table</p> <p>For coordinate axes, proper scale</p> <p>For correct and neat Histogram</p>	Age (in years) (Class interval)	Frequency	Width of the class	Height of the rectangle	1–2	5	1	$\left(\frac{5}{1} \times 1\right) = 5$	2–3	3	1	$\left(\frac{3}{1} \times 1\right) = 3$	3–5	6	2	$\left(\frac{6}{2} \times 1\right) = 3$	5–7	12	2	$\left(\frac{12}{2} \times 1\right) = 6$	7–10	9	3	$\left(\frac{9}{3} \times 1\right) = 3$	10–15	10	5	$\left(\frac{10}{5} \times 1\right) = 2$	15–17	4	2	$\left(\frac{4}{2} \times 1\right) = 2$	2 1 2
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C	22	(i) $x = 3$ (ii) $x - y = 0$	1 1																								
C	23	 <p>OA = 4 units, OP = 3 units</p> <p>By Pythagoras property OP = 5 units</p>																									
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C	27	$x - 2y - 10 = 0$ $x + y = 5$, $2x + y = 7$ (1 mark for each equation)	1 1+1																								
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C	32	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Class interval</th> <th style="text-align: center;">Frequency</th> <th style="text-align: center;">Class size</th> <th style="text-align: center;">Height of rectangle</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">10 - 14</td> <td style="text-align: center;">5</td> <td style="text-align: center;">4</td> <td style="text-align: center;">$\frac{4}{4} \times 5 = 5$</td> </tr> <tr> <td style="text-align: center;">14 - 20</td> <td style="text-align: center;">6</td> <td style="text-align: center;">6</td> <td style="text-align: center;">$\frac{4}{6} \times 6 = 4$</td> </tr> <tr> <td style="text-align: center;">20 - 32</td> <td style="text-align: center;">9</td> <td style="text-align: center;">12</td> <td style="text-align: center;">$\frac{4}{12} \times 9 = 3$</td> </tr> <tr> <td style="text-align: center;">32 - 52</td> <td style="text-align: center;">25</td> <td style="text-align: center;">20</td> <td style="text-align: center;">$\frac{4}{20} \times 25 = 5$</td> </tr> <tr> <td style="text-align: center;">52 - 80</td> <td style="text-align: center;">21</td> <td style="text-align: center;">28</td> <td style="text-align: center;">$\frac{4}{28} \times 21 = 3$</td> </tr> </tbody> </table>	Class interval	Frequency	Class size	Height of rectangle	10 - 14	5	4	$\frac{4}{4} \times 5 = 5$	14 - 20	6	6	$\frac{4}{6} \times 6 = 4$	20 - 32	9	12	$\frac{4}{12} \times 9 = 3$	32 - 52	25	20	$\frac{4}{20} \times 25 = 5$	52 - 80	21	28	$\frac{4}{28} \times 21 = 3$	2
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		For coordinate axes, proper scale For neat and accurate graph	1 2
		End of The Marking Scheme	